

### REMARKS

Entry of the foregoing, reexamination and reconsideration of the subject matter identified in caption, as amended, pursuant to and consistent with 37 C.F.R. §1.112, and light of the remarks which follow are respectfully requested.

Claims 1-31 are pending in the application, claim 31 having been added above. Of these, claims 1-12 have been withdrawn from consideration as being directed to a non-elected invention.

By the foregoing amendments, independent claims 13, 24 and 27 have been amended to further point out that the dielectric layer has a “uniform thickness.” Support can be found at least in the drawings. In addition, claim 30 has been amended by pointing out that the metal pad structure comprises a “first” region for receiving an active optoelectronic device connected to a “second” region for electrical connection, “wherein the first and second regions are coplanar”. Support can be found at least in Figure 1 and page 9, lines 2-5 of the specification. Claim 30 has further been amended to point out that the metal pad structure is “non-sacrificial”. Support can be found at least in Figure 1 and page 9, lines 2-5 of the specification. Other amendments are for form. Newly presented claim 31 points out further aspects of the invention, support for which can be found at least at page 9, lines 2-5 of the specification.

Turning now to the Official Action, claims 13-30 stand rejected under 35 U.S.C. §102(b) as being anticipated by *Ayliffe et al* (U.S. Patent No. 5,522,000). Claims 13-30 also stand rejected under 35 U.S.C. §103(a) as being obvious over *Ayliffe et al*. These rejections are respectfully traversed for at least the following reasons.

The present invention relates to etched optoelectronic apparatuses. The apparatuses as set forth, for example, in independent claim 13 comprises: a) a semiconductor substrate having an etched pit with semiconductor sidewalls; b) a dielectric layer disposed on the semiconductor substrate, wherein the dielectric layer is planar with a uniform thickness and has a hole with dielectric sidewalls, wherein the dielectric sidewalls are aligned with the semiconductor sidewalls; c) a patterned metal layer disposed directly on the dielectric layer, wherein the patterned metal layer has sidewalls aligned with the dielectric sidewalls and semiconductor sidewalls; and d) an

optical element in the etched pit. Independent claims 24, 27 and 30 set forth additional aspects of the invention.

*Ayliffe et al* discloses a method of making a multilayered printed circuit on a single crystal substrate for mounting thereon at least one electro-optic transducer and at least one optical component. The printed circuit has a plurality of electrical conductors. (Col. 2, lines 1-5).

*Ayliffe et al* does not disclose or suggest each feature of the present invention. For example, *Ayliffe et al* does not disclose or fairly suggest an etched optoelectronic apparatus having a dielectric layer disposed on a semiconductor substrate, wherein the dielectric layer has a uniform thickness, as set forth in independent claims 13, 24 and 27. Quite to the contrary, the *Ayliffe et al* dielectric layer 14 is shown as being non-uniform in thickness. *Ayliffe et al* discloses that prior to depositing the dielectric layer 14, a passivation layer 11 is deposited, a patterned interconnect layer 13 is formed on layer 11 and the dielectric layer 14 is formed over the patterned interconnect layer 13. The present invention as set forth in independent claims 13, 24 and 27 is not disclosed or suggested by *Ayliffe et al*.

Nor is the invention as set forth in independent claim 30 disclosed or suggested by *Ayliffe et al*. Claim 30 sets forth an etched optoelectronic apparatus comprising: a) a semiconductor substrate having an etched pit with semiconductor sidewalls; b) a dielectric layer over the semiconductor substrate, wherein the dielectric layer has a hole with dielectric sidewalls, and wherein the dielectric sidewalls are aligned with the semiconductor sidewalls; and c) a patterned metal layer over the dielectric layer comprising: sidewalls aligned with the dielectric sidewalls and the semiconductor sidewalls; and a non-sacrificial metal pad structure comprising a first region for receiving an active optoelectronic device connected to a second region for electrical connection, wherein the first and second regions are coplanar, and wherein the patterned metal layer is formed from a single mask.

*Ayliffe et al* does not disclose or suggest each feature of claim 30. For example, *Ayliffe et al* does not disclose or suggest a metal pad structure having a first region for receiving an active optoelectronic device connected to a second region for electrical connection, wherein the first and second regions are coplanar. The Official Action states

that “element 16a has a region for connection to a laser device and a bottom portion for further electrical connection.” (Official Action at page 3). Quite clearly, the alleged first and second regions of the *Ayliffe et al* device are not coplanar.

Accordingly, withdrawal of the rejections based on *Ayliffe et al* is respectfully requested.

Claim 30 stands rejected under 35 U.S.C. §102(b ) as being anticipated by *Pedder* (GB 2 215 087A). This rejection is respectfully traversed for at least the following reasons.

*Pedder* discloses a method of processing substrates used for aligning optical elements and components. The Official Action relies on the structures illustrated in Figures 3 and 4 of *Pedder* in the rejection, stating that:

The regions for receiving a device and electrical connection in claim 30 are taken as intended uses and the structure of the applied reference has to be only capable of the function and not teach the actual connections. (Official Action at page 3).

It is questionable at best whether the *Pedder* metal mask structure shown in the drawings has a first region capable of receiving an active optoelectronic device or a second region connected to the first for electrical connection. The Office is reminded that for a claim to be anticipated under “inherency”, i.e., that the *Pedder* structure is inherently capable of the claimed function, the Examiner must provide factual and technical grounds establishing that the inherent feature necessarily flows from the teachings of the prior art. *See Ex parte Levy*, 17 USPQ.2d 1461, 1464 (BPAI 1990). The inherency must flow as a necessary result from the prior art, not merely as a possible result. *See In re Oelrich*, 212 USPQ 323, 326 (C.C.P.A. 1981). That the *Pedder* structure would necessarily be capable of the claimed function has not been established.

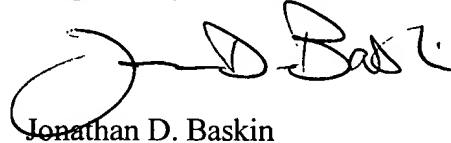
Moreover, the *Pedder* metal structure relied on in the Official Action is a sacrificial layer - that is, the metal layer is removed from the substrate before the device is completed (see, e.g., Figure 8 of *Pedder*). Thus, *Pedder* does not disclose or even remotely suggest the presently claimed non-sacrificial metal pad structure.

For at least the foregoing reasons, withdrawal of the §102(b) rejection based on *Pedder* is respectfully requested.

From the foregoing, further and favorable action in the form of a Notice of Allowance is believed to be next in order, and such action is earnestly solicited.

If there are any questions concerning this paper or the application in general, the Examiner is invited to telephone the undersigned at his earliest convenience.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Jonathan D. Baskin", written over a horizontal line.

Jonathan D. Baskin  
Attorney for Applicant  
Registration No. 39,499  
Telephone No.: (508) 787-4766  
Facsimile No.: (508) 787-4730

c/o EDWARDS & ANGELL, LLP  
P.O. Box 55874  
Boston, Massachusetts 02205  
Date: April 13, 2004